"EL SALITRE"—
THE SAGA OF A NATIONAL TREASURE

By O. A. GANGL

Never before has the world been so conscious of the importance of raw materials and of their influence on history as today, in this period of far-flung blockades and counterblockades. Everybody has realized that the outcome of the war and the future of mankind greatly depend on the possession of raw materials. Great changes have already taken place as a result of the Axis conquests in Europe and East Asia, and other changes are likely to follow. It is a foregone conclusion that the raw-material situation after the war will be radically different from what it used to be. We cannot yet predict exactly what it will look like, since history is still in the making. However, we can study the past. The following pages tell the story of one of Nature's great bounties, and how it was affected by the ambitions and wars of men.

The author is an engineer who spent some time working in Chile and who now lives in Japan.

The article concerns a country which, together with Argentina, has succeeded, in spite of extreme pressure from Washington, in remaining outside the war as one of the few islands of peace left in a world aflame. In her precarious position, Chile has let herself be guided by her good sense and by her national pride. Perhaps she has also remembered the drama which was forced upon her during the Great War, when the same Great Britain and the same USA who are trying to drag her into war again were responsible for the depreciation in value suffered by her national treasure.
—K.M.

FLIGHT OVER THE INFERNO

THE TWO motors of the Chilean Junkers plane roared monotonously. For several hours now we had been following the direction of the compass needle due north. It was hot; the sun stood straight before us, and its rays were reflected in a glittering haze from the silver-painted wings of our bird. The drowsy monotony of noise, heat, and light made one tired, and only rarely could one muster enough energy to throw a glance out of the window. The view was always the same, as it had been for hours: far off to the right the towering peaks of the bare Cordilleras, some of them still snow-capped; then a desert, the pampa, a desolate, lifeless landscape which reached right under us; and on the left the steep slopes of the coastal Cordilleras, along which we were flying. Through gaps in the bank of clouds clinging to their western slopes glistened the foaming breakers of the Pacific. As far as the eye could see everything was bare—no tree, no bush, hardly a trace of life of any kind. Only now and again a ruined corrugated iron shack or the traces of a path which seemed to lose itself in nothing, or maybe a railway track or the remains of a closed mine. Sometimes the form of the scenery seemed to indicate a river valley that had dried up aeons ago. But then the eternal sameness of rising and falling sand dunes with curious rock formations began again. Perhaps Dante imagined his Inferno to be like that.

Involuntarily one was struck by the thought that a forced landing in such a desert could be quite a disagreeable adventure. Ever since La Serena, where for the last time green, cultivated country had smiled up at us, this Nothingness had laid its spell upon us in our flight. But, as a compensation, Nature has endowed this waste with colors which run extrav-

agantly from deepest red, through blue-green and shimmering gray, through the whole spectrum to the white of the distant snow and finally to the delicate blue of the eternally cloudless sky, constantly changing according to the angle at which the rays of the sun are reflected.

The airfields we landed at fitted perfectly into their desolate surroundings. A level square marked with stones, a miserable corrugated iron hut, and a windsock were the only things to indicate the purpose of the place. We had left Santiago at nine in the morning, and at two in the afternoon, far out at sea, we dived with rather a queer feeling through the cloudbank of the coastal mountains and landed in Iquique. We had covered approximately nine hundred miles in this time. And now we were in what had once, together with Antofagasta, been the metropolis of the Chilean saltpeter territory, the center of the great, bygone times of this country. The last outward signs of this past in these cities, which had grown so fast at that time, are the extraordinarily palatial banks and administration buildings of the great nitrate enterprises, which are so out of place beside the modest wood and corrugated iron houses in these sober tree- and gardenless desert towns by the sea.

"WHITE GOLD"

The people, too, were obliged to change with the disappearance of the good old days of the nitrate boom, and to forget the luxury and glamour of those times given to them by *El Salitre*—the white gold. Now and again some old veteran of the pampa becomes talkative and tells about the fabulous incomes of ordinary clerks and the social magnificence of the factory casinos in the lonely pampa, when almost every employee kept his own horse, and when the best of drinks were at the disposal of the employees free of charge, because the companies wanted to keep them in good humor and make their life in those deserts halfway bearable.

As can be seen from our map, the major nitrate deposits in present-day Chile are to be found in a belt some ten to twenty-five miles wide stretching from Pisagua in the north to the vicinity of Chañaral in the south. This region is to the east of the coastal Cordilleras in the interior of the country, on a plain some 3,000 to 8,000 feet above sea level. Near Iquique it is formed by the broad, dry valley of Tamarugal. Further south we find the Pampa del Toco, the Pampa Central (crossed by the railway from Antofagasta to La Paz), the Pampa of Aguas Blancas near Antofagasta, and that of Taltal with the port of the same name.

The Spanish word *pampa* is taken from the language of the Quechua Indians and really means "plain," as used in the Argentinean pampas. In Chile, however, it has come to be used for any nitrate-bearing district, flat or mountainous, and each owner has then added some local name to distinguish his pampa from the other pampas.

As to the origin of the saltpeter, quite a number of scientific theories have been suggested. Volcanic forces have probably had an important hand in its formation, as is indicated by the presence of sulfates (sodium sulfate etc.). The majority of the present-day deposits are probably secondary or tertiary deposits originating from primary formations higher up in the mountains. However, the chemical composition, physical nature, appearance, and color of the *caliche* (raw saltpeter) often differ so widely even in the case of fields very close to each other that it would seem impossible to find a uniform explanation for the origin of the saltpeter.

THE RAINS NEVER CAME

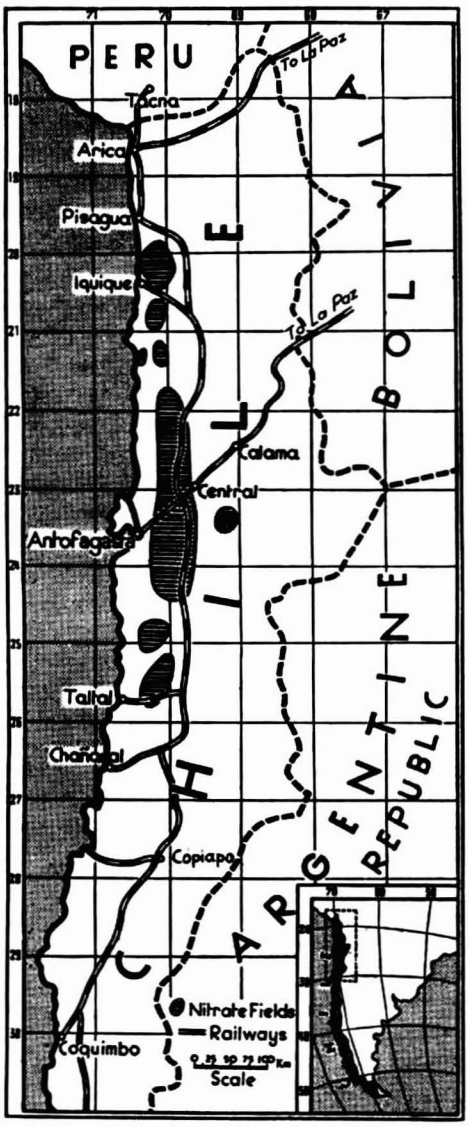
How can the fact be explained that such extensive deposits have been preserved to this day? The reply is to be found in the peculiar meteorological conditions prevailing in these parts of South America since time immemorial. The plateau containing the nitrate deposits is completely closed in to the west by the coastal Cordilleras, rising from 3,000 to 6,500 feet, and to the east by the main range of the Cordilleras, with peaks

up to 19,000 feet and more. These two ranges keep away the damp air, from the sea as well as from the Argentinean side, like walls. The result is that it never rains in the pampas. Only in the immediate vicinity of the coast and in the high mountains is there occasional mist and rain; but even in those places years may pass without a drop of rain falling. It is these extraordinary weather conditions which have made it possible for Nature to have preserved such vast quantities of highly hygroscopic salts, lying almost everywhere close to the surface, finally to benefit modern agriculture as an excellent fertilizer.

The raw material—the *caliche*—is obtained exclusively by open working. It lies close under the surface, covered by a one- to two-foot layer of soil, salt, or sulfate. The thickness of the deposits varies between one and six feet or more. The extent of the deposits is very irregular. Large, continuous layers usually contain a smaller percentage of nitrates than individual small spots. Deposits are often found on gentle hills and slopes; rich ones, however, occur in troughs but are never found in the old diluvial river valleys.

MAN TAKES A HAND

So Nature had presented Man with a rich treasure, which was waiting to be dug up and used. What did he do with this treasure?



Chile's Nitrate (Saltpeter) Deposits

For decades after its scientific discovery and the following industrial exploitation, Chile saltpeter formed almost the only raw material for the manufacture of nitric acid and other important nitrate compounds such as explosives, aniline dyes, etc. Above all, however, it was used in agriculture as a fertilizer. Industrial exploitation of the saltpeter deposits began about a hundred and thirty years ago. It was obtained with the primitive technical equipment of that time according to a process discovered by Taddaeus Haenke, a German living in Bolivia. After eliminating other admixtures, pure sodium nitrate was produced by this method.

Until then, the saltpeter deposits had remained entirely untouched. Now small saltpeter refineries sprang up in the district around Iquique, with large boiling vats heated by open fires. They were called *paradas*, and in their primitiveness they had nothing in common with the imposing factories which were to be found later in these parts. The fuel was supplied by trees felled in the Tamarugal valley. With the heedless cutting down that now commenced and the lack of reforestation, these trees soon came to an end.

Around 1830 the value of saltpeter as a fertilizer began to find growing recognition in Europe. The ensuing increasing demand for it led to a rapid develop-

ment of the saltpeter industry, and new factories, operating on a modern process (using steam during the process of solution), called *oficinas*, shot up like mushrooms. The pampa, till then practically uninhabited, gradually came to life, and the independent countries of Peru, Bolivia, and Chile, which were then being formed, very soon recognized the economic value of those desert belts containing saltpeter, so that even a war was fought for their possession, namely, the Saltpeter War of 1879-1883. The end of this conflict between Peru and Bolivia on the one hand and Chile on the other gave Chile, who had been victorious, the entire Peruvian and Bolivian territory involved.

UNTAXED OPULENCE

After taking over the territories formerly belonging to Peru and Bolivia, Chile was faced by two alternatives: either to retain the state monopoly which had been introduced by the Peruvian Government in the former Peruvian districts and perhaps even extend it to the old Chilean districts; or to continue the policy of free private enterprise she had hitherto pursued. It was decided to leave the field open for the foundation of private companies, and at the same time to impose a fixed tax in the form of an export duty at twenty-eight pence per Spanish hundredweight (50.6 lbs.).

Constantly increasing millions flowed into the Chilean state coffers from these duties. For many years the entire budget could be covered from the income of this industry, so that the Chilean could long consider himself lucky not to have to pay any taxes.

The profits were so great that, apart from the government, the individual capitalists also had large incomes. However, it was pleasanter to live in Paris or London than in primitive Chile. The riches so quickly acquired were usually spent just as quickly again abroad or through the importation of foreign luxury goods. As a result of this ceaseless flight of capital, the state treasury was unable to maintain a stable currency, in spite of the favorable industrial development. The consequence was a constant devaluation of the Chilean currency, which no financial measure, however clever, has been able to stop to this day. There seemed to be no enduring luck for Chile in her *salitre*.

THE BRITISH LION'S SHARE

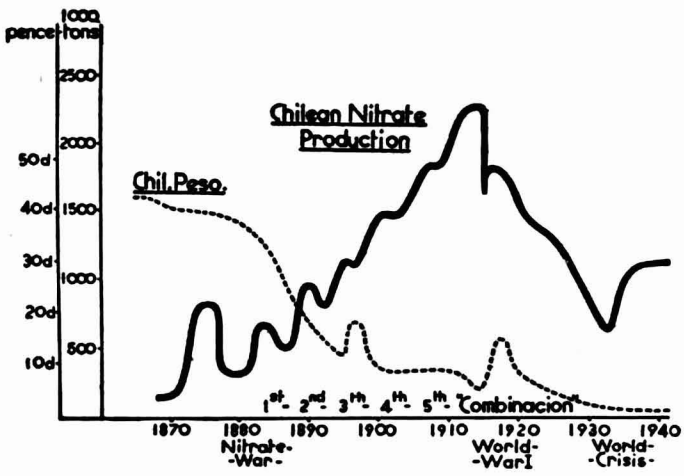
The Government's policy of economic freedom soon resulted in a wave of new enterprises being started, in which, besides Chile, the capital of a number of European countries had a share. British speculators made vast fortunes. The London Stock Exchange was in a fever over the founding of numerous new saltpeter companies, which had reached the imposing figure of fifteen by 1889. In this way the English acquired the main influence in this industry, and they managed to retain it during the following forty years. The control over yet another important raw material was in British hands, and Chile's national treasure was at the mercy of London's international stock exchange. However, the British were not alone. German, Italian, Spanish, and Dalmatian firms with capitals of millions undertook the erection of new *oficinas*, and through them there also came members of those nations in constantly increasing numbers to take up leading positions in the new enterprises.

OVERPRODUCTION AND SYNDICATES

The run that now began soon resulted in overproduction, which was followed by its well-known accompanying phenomena: insufficient sales, unsold products filling the warehouses, and falling prices. Attempts were made to come to an understanding, and a syndicate was formed that was to limit and allot the production. This was the first *Combinacion Salitrera* (Saltpeter Syndicate), formed in 1884, which, through the allotment of quotas, succeeded in reducing exports and forcing the price up again. However, the stocks stored in Europe were too large for the high price to be maintained. Hence attempts were also made to bring this market under control. "The Permanent Nitrate Committee" was

founded in London, which undertook a large-scale propaganda campaign for the use of saltpeter in all agricultural countries and thereby soon succeeded in doubling sales. Later on this Committee moved to Iquique. The cost of the campaign was borne by all the saltpeter companies in proportion to their production capacity.

However, the *Combinacion* had been formed for a period of a few years only. The free sales and unlimited production following thereon brought down the price of saltpeter to an impossible level again, for the very same reasons which had led to the formation of the first *Combinacion*. This situation led the *salitreros* to combine again in a second *Combinacion*, again limited to three years.



An almost fixed succession of developments had now come into being which constantly repeated itself. Uncontrolled production led to a decline in the price, whereupon the *salitreros* formed a *combinacion* for the purpose of achieving better prices. The *combinacion* limited production through the allotment of quotas, and the price gradually rose again. Then the *combinacion* came to its end. Production rose, the price fell, and the game started all over again. By 1906 this vicious circle had been completed five times.

WHENCE LABOR?

Meanwhile the appearance of the industry had changed tremendously. Increasingly bigger and more modern factories replaced the small and medium-sized plants. New processes made it possible to work raw material with twenty per cent and less mineral content. New probes were made and large, hitherto untouched reaches of pampa drawn within the scope of the large *oficinas* with their hundreds, sometimes over a thousand workers.

This brings us to one of the most burning problems of this industry, that of labor. During the early beginnings of the saltpeter industry in the last century, the supply of labor coming from Chile, Bolivia, and Peru without any special inducement was ample to fill all demands. At the beginning of the twentieth century, however, when so many new *oficinas* where established, a noticeable shortage of labor set in. The demands made on the laborers were not small. The great heat and dryness, the considerable height above sea level, the extreme changes in temperature between day and night in the pampas, and the other hardships imposed by this desert country called for tough and energetic human material.

Owing to the new border demarcation after the Saltpeter War, the Peruvians and Bolivians gradually moved away. They were replaced by Chileans. By making large promises it was at first possible to draw away miners from the neighboring southern Chilean provinces of Atacama and Coquimbo. But the supply of men from those districts was soon exhausted. Experiences made with agricultural workers from central Chile proved disappointing. The high wages paid them soon disappeared in drink and extravagance, and many of these men wandered back again or looked for easier work elsewhere.

FREE CIGARETTES

At one time laborers were employed in the South to work for a certain period for the *salitreras*. Their return trip and even their cigarettes were paid for, and at the end of the period they were sent back to their homes. This system entailed a great deal of unrest and caused friction between the various companies, so that it was soon dropped again and a certain permanency among the laborers was aimed at. Some of the *salitreros* tried to hold their laborers by establishing workers' homes, casinos, and other social amenities. Others, however, did not bother with such things. As a result, labor organizations were formed which began to insist upon their rights and gradually took on a socialist and communist coloring.

The organized workers insisted on participation in the profits, wages to be paid on a gold basis, and a reform of the sales in the shops attached to the factories. The growing discontent led to numerous strikes. In 1907 and 1908 there were severe disturbances in Iquique, where the workers of the surrounding *oficinas* had assembled by the thousand. Troops were sent from Santiago, and there were many casualties.

After the Great War, when communism gained an increasingly strong footing, there were again severe disturbances in the district of the Pampa Central. The entire office staff of the *oficina* San Gregorio was murdered by the stirred up mob of workers. The owners drew a lesson from these tragic events and from then on did more to look after their laborers. The State also took a hand. It introduced the most advanced social laws of all South American countries, and, as a result, the peace has hardly been disturbed again to this day.

VISIT TO AN "OFICINA"

When one drives today through the endless pampa on roads that are usually as straight as an arrow and consist of two asphalt tracks in the sand of the desert, and approaches a modern *oficina*, one is struck from afar by the neat white houses of the employees. The houses are furnished with all the modern comforts that North America can supply. The slightly simpler houses for workers' families and the barrack-like accommodation for unmarried workers are very little inferior to the employees' houses. They need no protection against rain or storm, only against the pitiless sun and the biting cold of the night. Corrugated iron is the main building material, but a cheerful coat of paint often gives the buildings a pleasant appearance, in spite of the ugly material. One feels quite touched by the pathetic little gardens which many of the people have raised in the sandy desert. A few flowers, a hardy shrub, and a little palm tree are the carefully nursed treasures, which may remind their owner that somewhere else in the world there are green forests and luscious meadows.

The casinos, with their card rooms, reading rooms, and social halls, are very much like the better-class hotels of our summer resorts. So it is possible to live quite decently in these factory plants if one overlooks the desolate scenery around one. Those plants run on foreign capital still have a large number of foreign employees who draw comparatively high salaries, even though the latter have shrunk quite a bit from the former heyday of the *salitre*.

The factories themselves are bare, corrugated iron sheds in which only a few men work. The majority are employed in the surrounding pampa, probing, blasting, and transporting the *caliche*, which often has to be brought over miles of narrow-gauge track, since the position of the *oficina* is not decided solely by the nitrate deposit but also by the presence of sufficient water. Subterranean waterways can be found quite frequently. It is only a question of locating them, which requires much experience.

In view of the great physical demands made on the laborers, wages are high in comparison to the rest of Chile. Women are not equal to these conditions and hence not suited as workers in the *sali-*

treras. A strict prohibition of alcohol prevents the wages being wasted senselessly, and so many a man, after hard years in the pampa, can take a tidy sum in savings back with him to the South. But many do not find their way back, recklessly spend their savings on their holiday trips, and finally end up as those strange, cheerful *pamperos* who cannot give up the desert, just as many sailors cannot give up the eternal sameness of sky and water.

SCIENCE BREAKS THE MONOPOLY

The Great War formed the decisive turning point in the history of saltpeter. The Golden Age of the industry was during the last few years before the outbreak of the war. It was a period of quiet prosperity. The world market had been conquered, and exports had grown to an undreamed-of extent. People still talk about the days when as many as twenty European sailing vessels filled the harbor of Iquique while waiting for their precious cargo of saltpeter. On their voyage there they often carried earth as ballast, and today one can walk through the beautiful park of Antofagasta with the curious knowledge that one is walking on European soil. The poor, sandy soil of this coastal strip would never have been able to produce so surprisingly rich a vegetation.

The outbreak of hostilities in 1914 and the ensuing uncertainty in world trade resulted in a general panic. Many *oficinas* closed down, thousands of workers were dismissed, prices crashed, and, within a few days, a flourishing industry collapsed as a result of the nervousness of its owners. As a consequence of the British blockade, Germany, the chief customer for saltpeter, who had till then bought approximately thirty per cent of the total production, was suddenly forced to drop out entirely. Although the Allies still depended on Chile saltpeter for the manufacture of their most important war material, i.e., powder and explosives, the production figures of 1914 were never reached again.

The worst thing for Chile was that the British blockade forced Germany to look for a substitute in her own country. German science managed to achieve the miracle. The inventors Bosch and Haber succeeded in producing ammonia—the basic material for the production of nitric acid—and nitrogen from air. In spite of her friendship for Chile, Germany could not, in her struggle, do anything but break Chile's saltpeter monopoly. This radically changed the market situation and even after the war the old times never returned.

SUSTAINED BY A BY-PRODUCT

The present existence of the Chilean saltpeter industry is based on the share allotted to it by the Saltpeter Syndicate of twenty-five per cent of the world's consumption. A large number of plants whose ruins bear witness in the pampa to the prosperity of 1914 have never been reopened. Chile is once again a poor country. The dream that lasted from 1879 to 1914 is over.

However, to the extent of its present production, Chile saltpeter will retain its importance for those countries that do not possess factories for the manufacture of nitrogen from air and are therefore dependent on the importation of saltpeter. And there is still that most important by-product of the manufacture of sodium nitrate from *caliche*, namely, rare iodine, which will, for a long time to come, justify the existence of the industry. As a matter of fact, ninety per cent of the world's supply of iodine is a by-product of the Chilean nitrate *oficinas*.

CHILEANS STILL HAVE FUN

I left this strange corner of the world with its dramatic history in the same way in which I came. The vast distances made it advisable to use the Chilean air line. This time the sun was behind us, and the pampa beneath us shone in entirely different colors from those we had seen on our way there. In Copiapo, the old gold-diggers' city which has also seen better days, I took the narrow-gauge railway to Santiago. We were covered

with thick layers of dust. The long journey soon encouraged the passengers to get friendly at cards and in conversation. The *pamperos* are jolly people, especially when they are on their way to the cool, green South and the world of wonders of a large city. There was much laughter over coarse jokes, and the dice box was shaken mightily in the little dining car to decide who was to pay for the drinks. During the day, seagulls accompanied the little train for hours as if it were a ship on the high seas. Now and again they snatched up titbits from the garbage thrown out of the dining car.

Groaning and grunting, the train crawled up the many mountain chains forming the east/west valley in northern Chile, only to wind its way down again into the next valley, tooting merrily. During one of those slow ascents, two humorists took it into their heads to jump out and run along beside the puffing train for a short distance. The joke was repeated several times with the laughing applause of the onlookers in the train. Then the engine driver finally got angry over such mockery of his train: he opened the throttle wide, and the two pranksters were left behind on the track with long faces. They could atone for their high spirits by a march of about twenty miles to the next little settlement.

Chile still has a sense of humor, and so the people find it easier to get over the hard times which repeat themselves more often in these South American countries, with their ceaseless ups and downs of good and bad days, than in other parts of the world.